May 18, 1926. 1,585,390

M. R. KONDOLF

COLLAPSIBLE BOX

Filed June 19, 1925

Fig. 1.

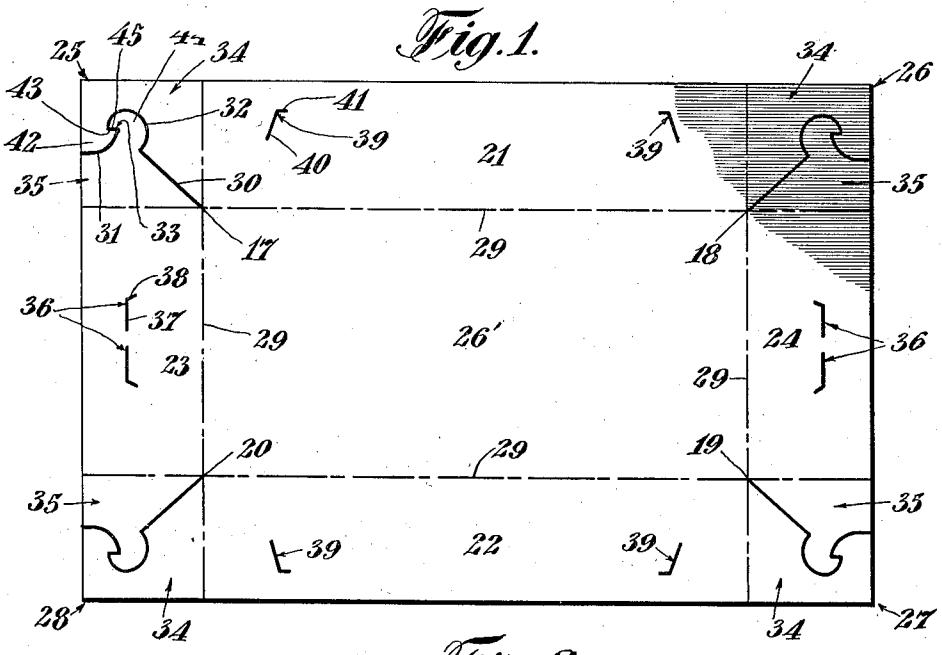


Fig. 2.

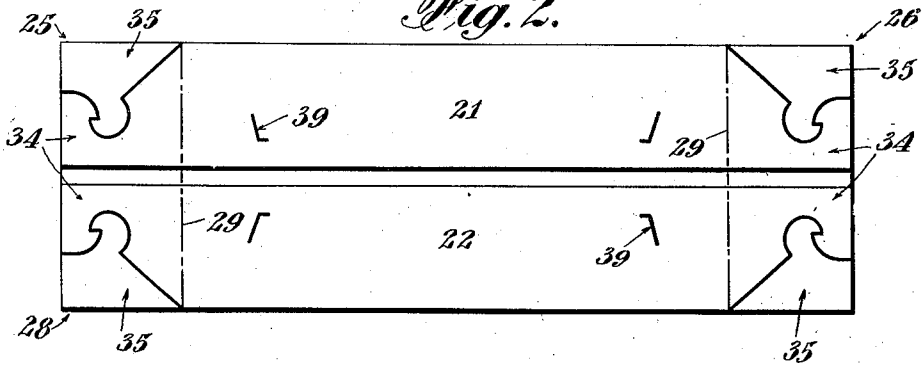
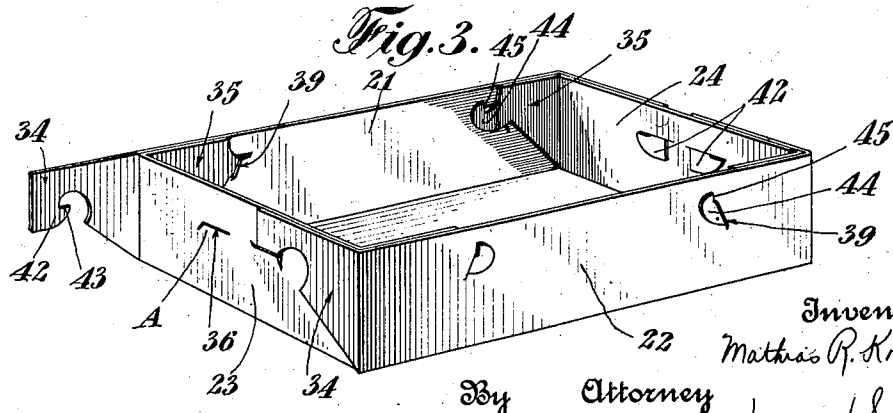


Fig. 3.



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UNITED STATES PATENT OFFICE.

MATHIAS R. KONDOLF, OF BALA-CYNWYD, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GARMENT CENTER FIBRE CONTAINER CORP., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COLLAPSIBLE BOX.

Application filed June 19, 1925. Serial No. 38,148.

My present invention relates generally to a box construction preferably of material such as fibre board, card board, etc. and more particularly to a box construction of this character which can be shipped and stored in knock-down or collapsed form and then set up when desired to be used.

While knock-down boxes of the character referred to serve advantageously because of the fact that they can be shipped and stored in flat form and need be set up only when it is desired to package merchandise therein, they present the disadvantage of generally requiring considerable manipulation, to cause them to assume a box-like form with the consequent consumption of time.

One of the important objects of my invention is the provision of a type of collapsible box in which the box in the collapsed form can be changed to the form in which it presents a box-like form with upstanding walls, with a minimum amount of manipulation and expenditure of time.

Another object of my invention is the provision of an arrangement for simultaneously reinforcing the corners of the box whereby the means for retaining the box in its set up condition also serve to reinforce the corners of the box.

In the setting up of a box of this character from a blank, there is generally an excess of material remaining and one of the important objects of my invention is the arrangement whereby this excess material serves to form the means for retaining the box in its set up condition and more particularly serves additionally to reinforce the corners.

Boxes of this character are sold in such tremendous quantities that any improvements whereby the box can be produced more cheaply due either to a saving in the cost of labor or material, or both, is a very large item in the problem of its commercialization. So also any improvements in a box construction of this character whereby the box can be set up from its flat or collapsed form more quickly is also an important item and one of the objects of my invention is the provision of an arrangement whereby a box of this character can be manufactured with a minimum amount of material and with the expenditure of a minimum amount of time and effort and the production of a box construction which can be set up quickly and which when set up, will withstand all the stresses and strains to which a box of this character is normally subject to when shipped with merchandise therein.

My invention generally resides in an arrangement whereby a flat strip of material of the character referred to and which is scored or otherwise treated along lines parallel to and equi-distantly spaced from the side and end edges of the strip so as to provide the hinge lines along which the sides and ends of the strip can be folded to form the side and end walls of the box, has the portions which are formed at each corner between the ends of these score lines cut from the point adjacent each corner where the score lines cross to an outer edge of said corner piece in such a manner as to provide by a single cut, two separate flaps, each of which has one or more locking lips thereon with one of the flaps hingedly attached to an end of a side wall and the other flap hingedly attached to the adjacent end of the adjacent end wall. As a result of this arrangement, the four separated walls are formed each independent of the other and the two flaps formed at each corner as described, hinge about adjacent ends of two adjacent walls, which ends are positioned vertically when the walls are in their vertical position, so that one flap may assume a position superposed upon the inner face of the adjacent wall, and the other flap at said corner may be caused to assume a position superposed upon the exterior face of said other adjacent wall.

My invention further provides an arrangement such as slots on the side walls adjacent the corner, whereby the locking lips on each flap may be interlocked with said adjacent wall.

For the attainment of these objects and such other objects as may hereinafter appear or be pointed out, I have illustrated an embodiment of my invention in the drawings, wherein:—

Fig. 1 is a top plan view of a blank or strip in its fully extended position;

Fig. 2 is a similar view of the blank of Fig. 1 partly folded for purposes of storing and shipping; and

Fig. 3 is a perspective view of the box in its partly set up or folded condition.

In Fig. 1 of the drawing, I show the blank from which a box body or tray is to be made and this blank or strip comprises a rectangular sheet of material such as, card board or fibre board, scored for the full length of the blank along lines parallel to the opposite side edges thereof and also scored for the full width of the blanks and parallel to the end edges. These score lines intersect at the points 17, 18, 19 and 20, thus defining the side walls 21 and 22 and the end walls 23 and 24 as well as the rectangular corner portions 25, 26, 27 and 28, each of which corner portions is formed what is in fact surplus material and which I employ for the purposes of locking the box in its set up position in a manner which I will shortly describe.

Those portions of the score lines in between adjacent points of intersection form the hinges along which the sides and end walls fold or bend so as to permit these walls to assume their position at an angle to the bottom 26' to form the box and to these scored wall hinges, I have applied the reference characters 29. Preferably although not necessarily simultaneously with the cutting of the rectangular strip of Fig. 1, from a larger or continuous sheet of material, I cut through each corner piece 25, 26, 27 and 28 from the adjacent joint of intersection 17, 18, 19 or 20 of the score lines as referred to, to the outer edge of each corner piece along an irregular line so as to form from each corner piece two locking flaps and also provide in each of the walls, means for cooperating therewith for securing the box in the set up condition as will now be more fully set forth.

As in the illustrated embodiment, each wall and corner piece are similarly treated, the description of the treatment of the end walls 21 and 23 and of the intermediate corner piece 25 will suffice for the rest.

The cut through the corner piece 25 comprises at one end the straight portion 30 starting from the end adjacent the point of intersection 17 of the score lines and at the other end the curved cut 31 starting at the outside and open through the edge of the material and the two are connected to form a complete single cut by the curved cut 32 and the short cut 33. It will be observed upon viewing this figure that the portion 31 of the cut opens into the side edge of the blank and that the cut made up of the portions 30, 31, 32 and 33 divide these corner portions into the two flap portions 34 and 35, the character of which can be more fully understood from an observation of Fig. 3 of the drawing. The end wall 23 of the blank is provided intermediate its ends with the cuts or slot 36 each made up of the angular portions 37 and 38 as shown. The side wall 21 is similarly provided adjacent each end with the slot 39 made by cuts 40 and 41 at an angle to each other and for purposes that will be understood as this application is read.

Upon viewing Fig. 3 of the drawing, it will be observed that the cuts 30, 31, 32 and 33 in the corner 25 are of such a character that they provide on the flap 34 a locking tab 42 having thereon the locking hook or shoulder 43 resulting from the fact that the cut 31 is concave as far as the flap 34 is concerned, whereas, the cut 32 is convex and the inner terminal of the former cut extends slightly inwardly of the adjacent terminal of the latter cut and that the straight cut 33 connects these two terminals, thus producing the projecting or extending locking lip 42.

These same cuts produce a reversally or oppositely directed locking lip or tab 44 in the flap 35 due to the fact that the cut 31 which is convex with reference to this lip has its inner terminal extending slightly inwardly of the adjacent terminal of the cut 32 which is concave with reference to such lip, these two cuts being joined by the short straight cut 33, thus forming the locking tab 44 which carries the locking hook 45. It will be understood that the dimensions of these locking tabs 42 and 44 and of the locking lips 43 and 45 are predeterminedly dimensioned relatively to the dimensions of the slots 36 and 39, as will now be pointed out. The portions 31, 32, and 33 of the cut form what is in fact an ogee cut with portions thereof displaced laterally of each other by means of the short connecting cut 33, thus providing the oppositely positioned flaps or tabs 42 and 44 having the oppositely directed locking hooks or lips 43 and 45.

In Fig. 3 of the drawing, I show the different corners in their successive stages in the setting up operation which I will now describe in connection with the two adjacent corners at one end of the box. The side walls 21 and 22 are moved about their scored hinges 29 to a vertical position relatively to the base 26' and an intermediate end wall then moved to a corresponding position with the flaps 35—35 taking a position superposed upon the inner face of the side walls 21 and 22. Due to the position of the parts, the locking extensions 44 will be brought into position of substantial registry with the adjacent slots 39 on the opposite side walls.

By applying pressure to the material below the slot 39, sufficient clearness is pro-

vided to permit of the insertion of the locking extensions 44 into these slots, it being understood that in this act of insertion, the locking extensions 44 will swing about the score lines 29 which forms the hinge for the bottom of the end wall as an axis until the locking extension 44 is fully inserted. The parts are so positioned and dimensioned that during this insertion, the locking lips or hook 45 will correspond in position with the parts 41 of the cut which forms the slot 39 and when this locking lip is fully inserted, the parts of the side wall on each side of the cut 39 will tend to assume their normal position in the same plane, and will so position the material on both sides of the cut 41, as a result of which the locking lip 45 will be forced out of the plane of the cuts which form the slots 39 so that the locking lip 45 will engage with the edge of this cut so as to positively prevent the withdrawal of the locking lips unless the material above and below the cut 39 are again moved out of their plane and even in this event, the withdrawal of the lips will be difficult.

Due to the fact that these flaps 35 were moved into position along the arc of a circle of which the lower hinge 29 of the end wall is the axis, the adjacent locking flaps 34 are now brought into position adjacent the cuts 36 in the end walls by a compound movement about the score line at the lower end of the side walls and the score line which forms the hinge by which the locking flaps 34 are secured to the side wall, the locking extension 42 is brought into registry with and inserted into the slot 36 and the locking lip 45 locked into position against removal substantially in the same manner as already described in connection with the locking lips 43 on the locking flaps 35.

By this arrangement and more particularly by the manner in which the corner piece 25 has been cut through to form the two flaps, I not only provide locking lips to hold the box in set up position, but also provide the box with a double reinforced corner and in addition, the two locking means on opposite sides of each corner cooperate with each other to hold each other in position.

It will be observed therefore by the character of knock down boxes herein described and illustrated, that I have provided a construction in which the material which is ordinarily surplusage in boxes of this character is employed not only so as to secure a locking arrangement of high efficiency, but also a reinforced corner construction without the employment of any other elements, features or operations such as sewing or stapling.

This box construction also possesses the decided advantage from the standpoint of shipment because as shown in Fig. 2 of the drawing, in its collapsed state it takes a two layer form, the lower layer being made up of the bottom 26 and the two end walls 23 and 24 upon which are superposed on one side one side wall 21 and the adjacent corner pieces 25 and 26 on the other side of which is superposed the opposite side wall 22 and its adjacent corner pieces 27 and 28.

Due to the manner of forming the flaps 34 and 35, the former including as stated, the locking tabs 42 and the locking lips 43 and the latter including the locking tabs 44 and the locking lips 45, it will be understood that when the flap 35 is secured in position with the hooks 45 in full engagement with slots 39 that the box will be initially assembled and that when the locking lips 43 are thereafter engaged with the end wall, that this last mentioned engagement will not only serve to complete the assembly of the box, but will also serve to hold the first mentioned locking lips or hooks against disengagement. In other words, the disengagement of the locking lips from its association with the side walls 21 and 22, will be prevented not only by its own inherent construction and manner of association with such side walls, but also by the engagement of the locking lips 43 with the end walls.

It will be furthermore observed upon viewing Fig. 3 of the drawing, that the flaps 34 and 35 at the corners extend for the full depth of these corners and for the full depth of the box so that with the initial assembly of the box which occurs as the locking lips 45 are in full engagement with the slot 39 in the side walls 21 and 22, a continuous wall structure will be provided so that with this initial assembly, the continuity of the wall structure will be attained, and pilfering through the corners prevented.

The cut 30 and the cut 33 in each corner portion form spaced abutments or stops to prevent movement of the flap in either direction from its position of association in the slots 36 and 39.

In Fig. 1 of the drawing, I have shown the grain of the board as extending lengthwise of the strip on the blank and in Fig. 3 of the drawing, I have shown the effect produced in this respect as result of the manner in which I form the flaps 34 and 35 and upon viewing this figure, it will be observed that the grain of the material extends either diagrammatically or diagonally of the cuts, so that the most effective resistance is offered by the box structure material to tearing stresses and strains.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. A collapsible box comprising a single sheet scored to define side and end members of substantially uniform width, said scoring

crossing to define substantially square corner areas with a single line cut in each of said corners producing two initially inter-engaging hooks adapted to be separated and folded one inside and the other outside of the upturned side and end members, said side and end members being provided with slits properly positioned to receive said hooks when in such folded positions.

2. A collapsible box comprising a single sheet scored to define side and end members of substantially uniform width, said scoring crossing to define substantially square corner areas with a single line cut in each of said corners extending from the junction of the scoring producing two initially interengaged hooks adapted to be separated and folded one inside and the other outside of the upturned side and end members, said side and end members being provided with slits properly positioned to receive said hooks when in such folded positions.

3. A collapsible box comprising a single sheet scored to define side and end members of substantially uniform width, said scoring crossing to define substantially square corner areas with a single line cut in each of said corners producing two initially interengaging hooks adapted to be separated and folded one inside and the other outside of the upturned side and end members and extending in opposite directions from the corner, said side and end members being provided with slits properly positioned to receive said hooks when in such folded positions.

4. A collapsible box comprising a single sheet scored to define side and end members of substantially uniform width, said scoring crossing to define substantially square corner areas with a single cut in each of said corners producing two initially interengaged hooks adapted to be separated and folded one inside and the other outside of the upturned side and end members, said side and end members being provided with slits properly positioned intermediate the upper and lower margins to receive said hooks when in such folded positions.

5. A collapsible box comprising a single sheet scored to define side and end members of substantially uniform width, said scorings crossing to define substantially square corner areas with a single line cut in each of said corners extending from the junction of the scoring producing two initially inter-engaging hooks adapted to be separated and folded one inside and the other outside of the upturned side and end members and extending in opposite directions from the corner, said side and end members being provided with slits properly positioned intermediate the upper and lower margins to receive said hooks when in such folded positions.

In witness whereof, I have hereunto signed my name.

MATHIAS R. KONDOLF.